

Remarks

Claims 1 to 18 and 20-31 are pending. Reconsideration of the application is respectfully requested.

Claim Objections

Claims 1-18 and 20-31 have been objected to for the use of the phrase “consisting essentially of” in claims 1 and 20.

Applicants disagree with the position taken in the Office Action. The Office Action provides no basis for objecting to the phrase “consisting essentially of” in claims 1 and 20. The transisitional phrase “consisting essentially of” is well recognized (see, e.g., M.P.E.P. 2111.03) and is viewed as occupying a middle ground between closed claims (i.e., written in “consisting of” format) and fully open claims (i.e., written in “comprising” format). The meaning of “consisting essentially of” in the present claims is discussed in the specification, for example, at page 9, line 31 to page 10, line 5. Withdrawal of this objection is respectfully requested.

§ 102 Rejections

Claims 1-5, 7-14, 18, 20-27 and 31 stand rejected under 35 USC § 102(b) as being anticipated by Holmes et al. (U.S. Patent No. 5,690,705).

Applicants respectfully traverse the rejection and submit the following remarks.

For a prior art reference to constitute anticipation, it must not merely approximate or be almost the same as the patent claim in question. Anticipation requires the disclosure of each and every element of the claimed invention in a single prior art disclosure. Applicants' claimed method and abrasive article includes an abrasive coating that is free of abrasive particles and consists essentially of a hardened binder coating comprising a plurality of precisely-shaped protrusions; and a diamond-like carbon coating superposed and adhered to at least a portion of the structured surface of the hardened binder coating. The articles of Holmes et al. include abrasive particles in either the precisely shaped abrasive particles or adhered to the backing by the make coat. As discussed at column 15, lines 13-19:

“In another aspect of this invention, the precisely shaped particles do not contain any abrasive grits. These precisely shaped abrasive particles that are free of abrasive grits can be used in a coated abrasive article as a diluent particle. For example, a coated abrasive article may comprise a backing, and bonded to the backing are abrasive grits and precisely shaped particles that are free of abrasive grits.”

Therefore, as reported in Holmes et al., when the precisely shaped abrasive particles are free of abrasive grits, they are used as diluent particles in an abrasive article that includes grits bonded to the backing by the make coat. Since Holmes et al. does not teach an abrasive article having an abrasive coating that is free of abrasive particles, Holmes et al. does not anticipate Applicants' invention of claims 1-5, 7-14, 18, 20-27 and 31. Withdrawal of the rejection under 35 U.S.C. 102(b) is respectfully requested.

Claims 1-5, 7-14, 18, 20-27 and 31 stand rejected under 35 USC § 102(b) as being anticipated by Pollasky (WO 99/43491).

Applicants respectfully traverse the rejection and submit the following remarks.

Pollasky relates to an abrasive material comprising a base surface having a plurality of pyramidal shapes protruding from the base surface. The protrusions are formed of the same material as the base surface and may have a substantially triangular, square, or polygonal base and triangular sides which meet at an apex which substantially forms a point. A coating is applied to improve abrasive performance and reduce surface porosity.

For a prior art reference to constitute anticipation, it must not merely approximate or be almost the same as the patent claim in question. Anticipation requires the disclosure of each and every element of the claimed invention in a single prior art disclosure. Specifically, Pollasky does not teach or suggest an abrasive article including a backing having a first major surface and a second major surface, as claimed by Applicants. The abrasive material of Pollasky consists of a base surface having a plurality of pyramidal shapes protruding from the base surface. Pollasky does not include a distinct backing material separate from an abrasive coating. In addition, Pollasky does not teach or suggest a diamond-like carbon coating superposed and adhered to at least a

portion of the structured surface of the hardened binder coating. Rather, the coating in Pollasky is described at page 3, lines 4-6 as “nickel or chrome plating, or a diamond coating or plating in combination with diamond dust or boron nitride.” With respect to claim 1 (and dependent claims therefrom), Pollasky does not teach or suggest providing a substrate for mechanical treatment wherein the substrate selected from the group consisting of a rigid disk or a rigid disk substrate.

In addition, the dependent claims include features that are not taught nor suggested in Pollasky. For example, claim 2 recites that the mechanical treatment is texturing, buffing, or cleaning. Claim 3 recites that the substrate is a rigid disk substrate comprising a metal base having opposite major surfaces and a metal coating formed on at least one of the major surfaces. Claim 4 recites that the substrate is a rigid disk substrate comprising glass or ceramic. Claim 5 recites that the substrate is circular having a center and wherein step (c) comprises rotating the substrate about the center to form substantially circumferential scratches in the substrate. Claim 7 recites that step (c) comprises oscillating the abrasive article in a direction substantially perpendicular to a direction of travel of the substrate. Claims 9 and 22 recite that the backing has a machine direction axis and opposite side edges, each side edge being parallel to said machine direction axis, wherein said structured surface comprises a plurality of parallel elongate ridges deployed in fixed position on said backing, wherein each of said ridges intersects said side edges at an angle from about 0 degrees to about 90 degrees. Claims 10 and 23 recite that the parallel elongate ridges each comprise a continuous protrusion of hardened binder extending continuously between the side edges of the backing. Claims 12 and 25 recite that the ridges each comprise a plurality of separate precisely-shaped protrusions aligned with transverse centers located on said longitudinal axis. Claims 14 and 27 recite that the pyramidal shape comprises a truncated pyramidal shape. Claim 18 recites that the binder is an acrylate or a methacrylate.

In view of the foregoing, the rejection of claims 1-5, 7-14, 18, 20-27 and 31 under 35 USC § 102(b) as being anticipated by Pollasky (WO 99/43491) has been overcome and should be withdrawn.

§ 103 Rejections

Claims 1-18 and 20-31 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Stubbs et al. (U.S. Patent No. 6,277,160) in view of Martin et al. (U.S. Patent No. 5,551,959).

Applicants respectfully traverse the rejection and submit the following remarks.

Stubbs et al. reports a method for making an abrasive article having at least two abrasive coatings having different abrasive natures. The abrasive natures can differ, for example, by abrasive particle size, abrasive particle type, abrasive particle shape, fill, surfactant, or coupling agent. In one embodiment, the abrasive article does not include abrasive particles. Stubbs et al. does not teach or suggest the use of a diamond-like carbon coating.

The Office Action supplements the deficiency of Stubbs with Martin et al. The Office Action states that:

“Martin et al. teaches an abrasive article having a diamond-like coating layer (48) and it teaches provision of the hard carbon coating layer of DLC in the abrasive article, the cut rate and total cut are improved as compared to abrasive articles lacking the hard carbon layer., col. 5, lines 3-8. It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to modify the article of Stubbs et al. with a diamond-like coating as taught by Martin et al. to improve the cut rate for abrasive free applications, e.g., buffing and/or glass, wood, etc. polishing.”

Applicants disagree with the position taken in the Office Action. The Examiner has simply picked from among the many disclosed embodiments of the cited references without providing any motivation to combine the references to provide Applicant's invention. The prior art must provide a motivation or reason for the worker in the art, without the benefit of the teaching of the application, to make the necessary changes to the device. Here, there is no reason to select the abrasive article of Stubbs et al. that is free of abrasive particles and to modify this abrasive article by adding a diamond-like carbon coating. The Office Action states that “It would have been

obvious to one of ordinary skill in the art, at the time the invention was made, to modify the article of Stubbs et al. with a diamond-like coating as taught by Martin et al. to improve the cut rate for abrasive free applications, e.g., buffing and/or glass, wood, etc. polishing.” Applicants disagree. The teaching or suggestion to make the claimed combination and a reasonable expectation of success must be found in the prior art, and cannot be based on Applicants’ disclosure. There is no suggestion in Stubbs et al. of a deficiency with respect to cut rate. If one of skill in the art was motivated to increase cut rate, they would be taught Stubbs et al. to include abrasive particles in the abrasive article. That is, if one of skill in the art desired an increase in cut rate, they would not select an abrasive article without abrasive particles and then attempt to increase the cut rate via the addition of a diamond-like carbon coating. Rather, higher cut rate could be achieved by selecting embodiments of Stubbs et al. that include abrasive particles. Applicants’ improvement lies not in increasing the cut rate of an abrasive article, but rather in utilizing an abrasive article that is suitable for mechanically treating a rigid disk or rigid disk substrate without introducing into the process abrasive particles that could potentially contaminate the treated surface. This is not taught nor suggested in the prior art.

The Examiner has clearly relied upon improper hindsight in making this rejection, as the prior art does not provide motivation or reason for the worker in the art, without the benefit of the teaching of the application, to combine the references as suggested in the Office Action.

In view of the above, it is submitted that the rejections of claims 1-18 and 20-31 under 35 U.S.C. §103(a) have been overcome and should be withdrawn.

Claims 1, 2, 5-18 and 20-31 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Martin et al. in view of Stoetzel (U.S. Patent No. 5,928,394)

Applicants respectfully traverse the rejection and submit the following remarks.

Martin et al. describes abrasive articles having a diamond-like coating and methods for making same. The abrasive articles of Martin et al. include abrasive particles adhered to a make coating (see, FIGS. 1-3) or dispersed throughout a slurry coating (see, FIG. 4).

Martin et al. does not teach or suggest an abrasive article that is free of abrasive particles as claimed by Applicants. With respect to the statement highlighted by the Examiner at column 5, lines 1-2, this statement only suggests that the organic binder layer immediately below the hard coating (i.e., diamond-like carbon coating) may be formulated with or without abrasive particles. This statement does not teach or suggest that the entire abrasive article is free of abrasive particles, as the abrasive particles may be included within or between other layers of the article. With respect to the statement at column 9, lines 65-67, this is a general statement of features found in abrasive articles of the invention. There is no teaching or suggesting of an abrasive article that is free of abrasive particles.

The Examiner supplements the deficiency of Martin et al. with Stoetzel, stating that:

“It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to modify the abrasive article of Martin et al. by eliminating the abrasive particles in the binder (44) as taught by Stoetzel to adapt the article for polishing soft workpieces, col. 8, lines 6-8.”

Applicants disagree with the position taken in the Office Action. The prior art must provide a motivation or reason for the worker in the art, without the benefit of the teaching of the application, to make the necessary changes in the device. Here, there is no reason to eliminate the abrasive particles from an abrasive article of Martin et al., as suggested in the Office Action. Martin et al. is concerned with increasing the cutting performance of an abrasive article by adding a hard coating of diamond-like carbon. If polishing soft workpieces was desired, one of skill in the art might vary the size, type, and/or density of abrasive particles according to teachings of Martin et al. (see, col. 11, line 43 to col. 12, line 43). Alternatively, one of skill in the art might utilize the abrasive articles of Stoetzel (i.e., that are free of abrasive particles) unaltered by the addition of a diamond-like carbon coating. The prior art simply does not teach or suggest the desirability of combining a diamond-like carbon coating and an abrasive article that is free of abrasive particles. Rather, as taught in the prior art, these features work in

generally opposite fashion to one another, with the addition of the diamond-like carbon coating increasing the abrasive property of the article, and the elimination of abrasive particles decreasing the abrasive property of the abrasive article.

The Examiner has clearly relied upon improper hindsight in making this rejection, as the prior art does not provide motivation or reason for the worker in the art, without the benefit of the teaching of the application, to combine the references as suggested in the Office Action.

In view of the above, it is submitted that the rejections of claims 1, 2, 5-18 and 20-31 under 35 U.S.C. §103(a) have been overcome and should be withdrawn.

Claims 1-18 and 20-31 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Martin et al. in view of Stubbs et al. (U.S. Patent No. 6,277,160)

Applicants respectfully traverse the rejection and submit the following remarks.

Martin et al. describes abrasive articles having a diamond-like coating and methods for making same. The abrasive articles of Martin et al. include abrasive particles adhered to a make coating (see, FIGS. 1-3) or dispersed throughout a slurry coating (see, FIG. 4). Martin et al. does not teach or suggest an abrasive article that is free of abrasive particles.

The Examiner supplements the deficiency of Martin et al. with Stubbs et al. stating that:

“It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to modify the abrasive article of Martin et al. by eliminating the abrasive particles in the binder (44) as taught by Stubbs et al. to adapt the article for polishing and buffing applications, for workpieces that are softer than the composites in reducing costs i.e., elimination of the abrasive particles.”

Applicants disagree with the position taken in the Office Action. The prior art must provide a motivation or reason for the worker in the art, without the benefit of the teaching of the

application, to make the necessary changes in the device. Here, there is no logical reason to eliminate the abrasive particles from an abrasive article of Martin et al. as suggested in the Office Action. Martin et al. is concerned with increasing the cutting performance of an abrasive article by adding a hard coating of diamond-like carbon. If polishing soft workpieces was desired, one of skill in the art might vary the size, type, and/or density of abrasive particles according to teachings of Martin et al. (see, col. 11, line 43 to col. 12, line 43). Alternatively, one of skill in the art might utilize the abrasive articles of Stubbs et al. (i.e., that are free of abrasive particles) unaltered by the addition of a diamond-like carbon coating. The prior art simply does not teach or suggest the desirability of combining a diamond-like carbon coating and an abrasive article that is free of abrasive particles. Rather, as taught in the prior art, these features work in generally opposite fashion to one another, with the addition of the diamond-like carbon coating increasing the abrasive property of the article, and the elimination of abrasive particles decreasing the abrasive property of the abrasive article.

The Examiner has clearly relied upon improper hindsight, as the prior art does not provide motivation or reason for the worker in the art, without the benefit of the teaching of the application, to combine the references as suggested in the Office Action.

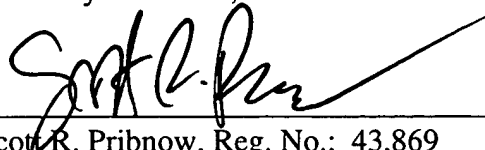
In view of the above, it is submitted that the rejection of claims 1-18 and 20-31 under 35 U.S.C. 103(a) has been overcome and should be withdrawn.

In view of the above, it is submitted that the application is in condition for allowance.

Allowance of claims 1-18 and 20-31 at an early date is requested.

Respectfully submitted,

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